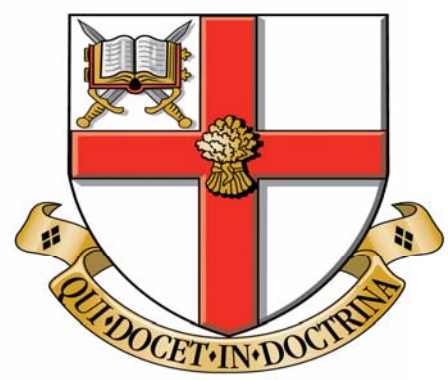

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Version of item: Given at conference

Wider Implications of Bike Design Diversity

Dr Peter Cox,
Senior Lecturer in Sociology and Politics

Short bio
now professional sociologist,
Founder member of cycling and society research group in 2004

Diverse designs

Possibilities highlighted in the Fahradhaus (last year?)

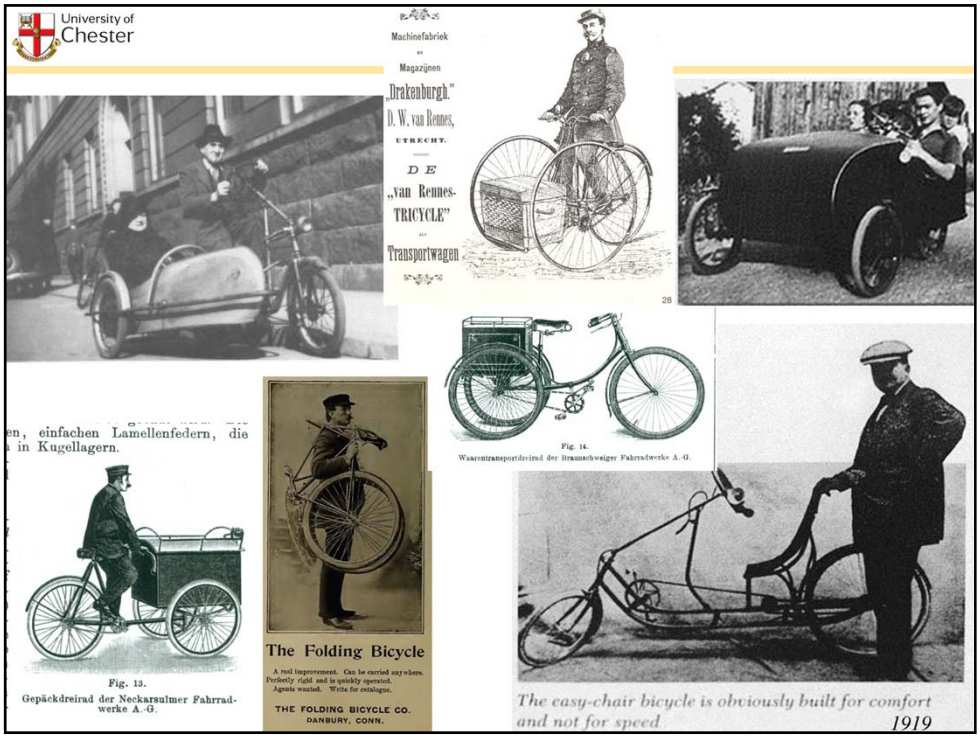
Bicycles of all shapes and sizes an increasingly familiar scene

(Incidentally the Economic commission for Europe inland Transport Committee Convention on Road traffic drawn up in Vienna 8 Novemebr 1968 (amended 1993) states:

CONDITIONS FOR THE ADMISSION OF CYCLES AND MOPEDS TO INTERNATIONAL TRAFFIC
ARTICLE 44
1. Cycles without an engine in international traffic shall:
(a) Have an efficient brake;
(b) Be equipped with a bell capable of being heard at a sufficient distance, and carry no other audible warning device;
(c) Be equipped with a red reflecting device at the rear and with devices such that the cycle can show a white or selective-yellow light to the front and a
red light to the rear.

Is a voice an audible warning device?

You may think about the diversity of uses and users you recognise
The bikes that you have ridden or might like to ride
why? When?
What journeys would they enable?



Also an historical reality
1895-1908 saw the creation of most of the innovations we now see as new

Small wheeler bikes,
Folding bikes,
cargo bikes, trikes and quadricycles
Electric bikes
Bikes with internal combustion hilfmotors
Bike trailers for cargo and passengers, sidecars
recumbent/ feet first position riding

Also pioneering use of new materials like aluminium,

Perhaps only the sheer numbers of 'conventional' bikes obscures this rich design history

But why am I, a sociologist, concerned about these issues?

Because previously
Cycle campaigner and ran a specialist cycle shop, matching machinery to people's needs

today concerned with interaction of how we can understand the world through a sociological imagination and the cycling world - the machinery I made and sold

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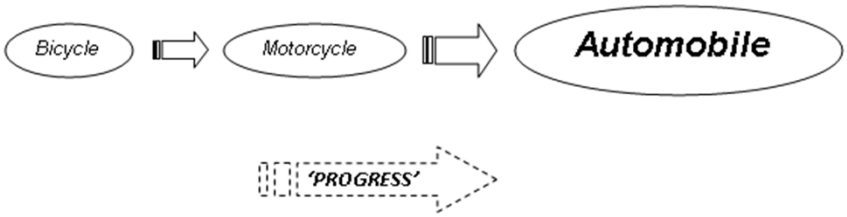
Thinking about technology

- Conventional approach to technology as an autonomous realm
- Focus on artefacts in isolation – e.g. the machines in the pictures
- Innovation, novelty and obsolescence



Conventional view

Approaches technology as autonomous realm
Focus on the object
Tendency to determinism
Tendency to privilege spectacular – mundane objects disappear
Tendency towards assumptions of progress and obsolescence
Frequently linear view of history

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Sociology of Technology

- Emphasis on technology as a social construction
- Privileges users and other actors
- Emphasises contexts of technology
- Examines technology in use

- What is a bicycle?
  - What is it used for?
  - How is it used?
  - By whom?

Social construction
How the idea and meaning of objects is formed from a series of forces considers how meaning is given to objects in their use.

What is a bicycle?
The bicycle only becomes meaningful in use.
What is it used for?
How is it used?
By whom?

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Thinking about technology

Key Observation:

- Different Technologies provides different opportunities and constraints (affordances)
- Affordance: the possibilities of action provided by any given object

Key Question:

- What is the relation between artefact and user?

Additional Problem:

- Users are diverse too!

Affordance
the possibilities of action provided by any given artefact
**** Not an inherent property of the artfact
But a product of the relation between the (non)user and the artefact.

River - crocodile, hippopotamus, insect

Conventional Bicycle does not represent a feasible means of transport for some,

Diversity may offer more opportunities for more people to see it as transport,

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Diversity of users

By social characteristics

- e.g. Age, gender, culture & tradition, experience, class, status, employment roles

By physical characteristics

- e.g. Health, fitness, impairment

By psycho-social characteristics

- e.g. Confidence, fear, expectation, values

These interact to shape diverse practices, needs and desires

Note these categories are not fixed (essentialised) but constructed within specific socio-historical, cultural milieux.

Understand construction of diversity
not always grouped according to obvious characteristics
Tempting to generalise e.g. about older cyclists

But let me take the example of a group of older cyclists I know well
riding all their life
still capable and desirous of riding
Would ride e-bikes but only if they are capable of replicating their previous expectations of riding (i.e. fast!)

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Linking diverse users with diverse bike designs

- Increased cycle use requires more users
- More users implies more uses

Diversity of bike design allows people to find machines that allow them to use bicycles when formerly they could not or would not want to.

Result

- Significant increase in range of actors, actions and activities

Logical argument contained in State plans for increased cycle use

But what happens when we take account of divergences and diversity

Even less true to think of a ‘typical cyclist’

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Affordances of diverse bike design

Bike technologies intentional (not evolving!)

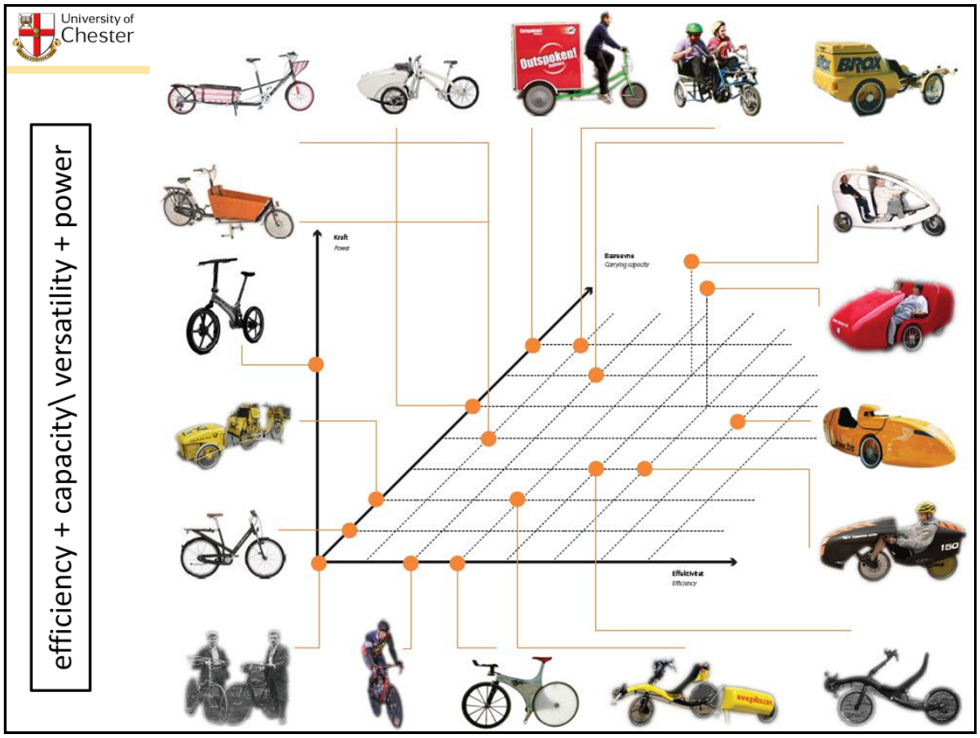
Deliberate intentions to maximise one or other particular factor

e.g.

- Speed (TT bike)
- Climbing efficiency (minimal mass)
- Comfort
- Utility
- Carrying capacity

These can be mapped in different ways…

We can map this diversity by thinking about how different capacities interact



Axes

efficiency
carrying capacity
Power

Image depicts cycle technologies in relation to one another
along with the possibility of adding extra power

But along wit the opportunities created by a diversity of technologies there are also constraints and implications

Diversity provides all sorts of opportunities for more ways to match the diversity of needs

Different users and different uses of bicycles demand different designs of bicycle to match the variety of people and activities. The possibilities are almost infinite. But changes can be grouped in 3 main ways as shown above: changes in carrying capacity; changes in efficiency; changes in the power available.
If we imagine a standard 'city bike' as the start-point of the graph above, the pictures show how other designs relate to it. Designs can be both more efficient and have more capacity. Power depends on the rider, and e-motors can help a weaker rider or compensate for increased weight of passengers or cargo carried.

Explanatory text
We all have an image of a 'normal' bicycle. But design can adapt the standard solo

machine in any of 3 ways.

a) We can give it more capacity. Trailers can be towed or sidecars attached, or different styles of carrier bikes, even rickshaws can be built
b) We can make it more efficient. The biggest gains come from reducing the frontal area (so less air has to be pushed out of the way), or by streamlining, making the whole shape 'slippier' (like a fish in water)
c) We can add power. Electric motors can be used to assist the rider, allowing for a range of human-electric hybrid vehicles.

(power variations also reflect different capacities of riders – see previous slide)

More needs provided for, more potential uses
all good so far
but….

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Implications (examples)

- Increased mass creates greater inertia: slower acceleration/ deceleration – potential conflict in mixed traffic
- Higher speeds (>24kph) may exceed design speed of infrastructure
- Loads may decrease manoeuvrability, increase physical footprint - questions arise over adequacy of parking facilities

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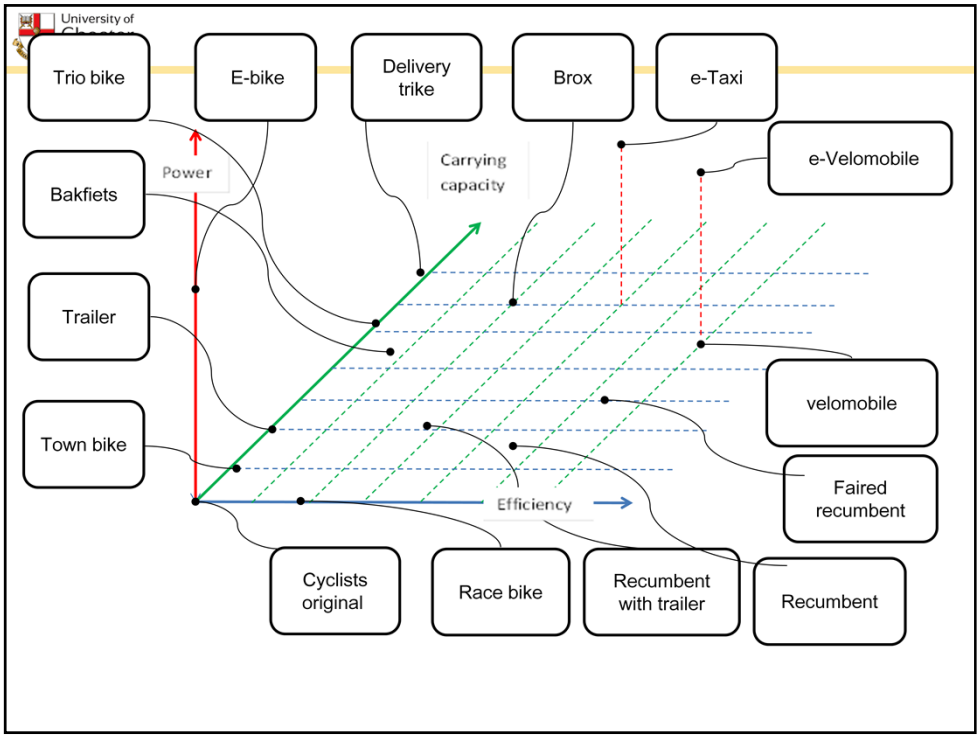
Dealing with diversity

- Consider how road space is designed to cope with variety of users –
  - Are cycle facilities designed with a multiplicity of users in mind?
  - Is the implicit assumption that users are homogeneous, riding in a neat single file at uniform speed and acceleration?
- Ultimately, do we design for yesterday or for the future?

Not urban but rather happy touring country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Trio bike
E-bike
Delivery trike
Brox
e-Taxi
e-Velomobile
Bakfiets
Power
Carrying capacity
Trailer
velomobile
Town bike
Faired recumbent
Efficiency
Cyclists original
Race bike
Recumbent with trailer
Recumbent